

DEVICES AND METHODS FOR CONTROLLING FLUID FLOW
USING ELASTIC SHEET DEFLECTION

ABSTRACT OF THE DISCLOSURE

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The invention relates to devices that control fluid flow, which comprise a substrate having an upper surface adapted to contact a flowing fluid and an elastic sheet immobilized with respect to the substrate, typically at a minimum of two immobilization points. The elastic sheet has a deflectable active area at least partially contained between the immobilization points; the lower surface of the sheet faces the upper surface of the substrate. Optionally, two or more electrodes are provided in contact with the active area of the elastic sheet. The device also includes an actuation means for deflecting the active area toward or away from the upper surface of the substrate. Additionally, the invention provides various methods for controlling fluid flow as well as methods for making devices that control fluid flow. The invention is particularly suited for microfluidic applications.

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